III Year I Semester	L	Т	Р	С
Code: 20EE5108	0	0	3	1.5
POWER ELECTRONICS LA	В			

Preamble: Power electronics deals with the processing and control of electrical power from an electrical source such as an AC mains supply, a battery bank, a photovoltaic array, or a wind turbine into a form and quality suitable for a particular electrical load. The power levels handled can vary from a few watts to several hundreds of megawatts. These circuits include power converters for DC to DC, DC to AC and AC to DC applications.

Course Objectives:

- 1. To study the characteristics of various power electronic devices and analyze firing circuits of SCR.
- 2. To analyze the performance of single-phase and three-phase full-wave bridge converters with both resistive and inductive loads.
- 3. To understand the operation of AC voltage regulator with resistive and inductive loads.
- 4. To understand the working of Buck converter, Boost converter, and inverters.

Course Outcomes:

- 1. Study the characteristics of various power electronic devices.
- 2. Analyze the performance of single-phase and three-phase full-wave bridge converters with both resistive and inductive loads.
- 3. Understand the operation of a single-phase AC voltage regulator with resistive and inductive loads.
- 4. Understand the working of Buck converter, Boost converter, single-phase square wave inverter, and PWM inverter.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1			2					3		2	3	2	-
CO2	3	2			1					3		2	3	2	-
CO3	3	1			2					2		2	2	2	-
CO4	2	2			1					2		2	2	2	-

CO – PO & CO – PSO Mapping:

*1 – Weak, 2 – Moderate and 3 – Strong

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S. No List of Experiments

- 1. Characteristics of Thyristor, MOSFET & IGBT.
- 2. R, RC & UJT firing circuits for SCR.
- 3. Three- Phase full converter with R &RL loads.
- 4. Boost converter in Continuous Conduction Mode operation.
- 5. Buck converter in Continuous Conduction Mode operation.
- 6. Single -Phase square wave bridge inverter with R & RL Loads.
- 7. Single-Phase PWM inverter
- 8. Single-Phase AC Voltage Regulator with R & RL Loads.
- 9. Single Phase dual converter in circulating current & non-circulating current mode of operation
- 10. Single -Phase semi converter with R & RL loads.
- 11. Single -Phase full converter with R & RL loads.
- 12. Single Phase steps down Cyclo-converter with R & RL Loads.

Reference Books

- 1. "Simulation of Power Electronic Circuit", by M.B. Patil, V.Ramanarayan, V.T. Ranganathan. Narosha, 2009.
- 2. MATLAB user's manual Mathworks, USA.
- 3. SIMULINK user's manual Mathworks, USA.